Barriers in the selection of offshore software development outsourcing vendors: An exploratory study using a systematic literature review

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ABSTRACT

Context: Software development outsourcing is a contract-based relationship between client and vendor organisations in which a client contracts out all or part of its software development activities to a vendor, who provides agreed services for remuneration.
Objective: The objective is to identify various barriers that have a negative impact on software outsourcing clients in the selection process of offshore software development outsourcing vendors.
Method: We have performed a systematic literature review (SLR) process for the identification of barriers. We have performed all the SLR steps such as the protocol development, initial selection, final selection, quality assessment, data extraction and data synthesis.
Results: We have identified barriers such as 'language and cultural barriers', 'country instability', 'lack of project management', 'lack of protection for intellectual property rights' and 'lack of technical capability' that generally have a negative impact on outsourcing clients. We have identified only one common frequently cited barrier in three types of organisations (i.e. small, medium and large) which is 'language and cultural barriers'. We did not identify any common frequently cited barrier in three continents (Asia, North America and Europe) and in two decades (1990–1999 and 2000–mid 2008). The results also reveal the similarities and differences in the barriers identified through different study strategies.
Conclusions: Vendors should address frequently cited barriers such as 'language and cultural barriers', 'country instability', 'lack of project management', 'lack of protection for intellectual property rights' and 'lack of technical capability' in order to compete in the offshore outsourcing business.

1. Introduction

Software outsourcing is a modern software engineering paradigm in the context of global software development [25]. Many companies are adopting the Global Software Development (GSD) domain to reduce software development cost [17]. Vendor organisations are struggling to compete internationally in attracting outsourced software development projects. Due to the increasing trend of GSD we are interested to discover which barriers have a negative impact on the software development outsourcing clients in the selection of offshore software development outsourcing vendors. This paper presents an exploratory study in which a systematic literature review (SLR) [22] is conducted in order to identify these barriers. Identifying these barriers will assist software development outsourcing vendors in addressing those barriers in order to be ready for software development outsourcing initiatives. Our long term research goal is to provide software development outsourcing practitioners with a body of knowledge that can help them to improve GSD processes.

In order to reduce development cost, offshore software development outsourcing has become an important process of GSD. Software development outsourcing is a contract-based relationship between client and vendor organisations in which a client contracts out all or part of its software development activities to a vendor, who provides agreed services for remuneration [1,18]. Over the last decade, many firms in the US and UK have outsourced software development projects to offshore countries [42]. There are many reasons for software development outsourcing [6]. Client organisations benefit from offshore outsourcing because vendors in developing countries (offshore vendors) usually cost one-third less than onshore vendors [28]. It is professed that offshoring

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vendors can add significant value to their clients' supply chains [44]. However, in addition to the outsourcing benefits there are many risks in an outsourcing process [9,13].

Many problems have been reported in the offshore software outsourcing process. One of the key challenges is to handle complex communication and co-ordination problems in conditions of time and cultural separation [3,10,13,42]. Other challenges are to develop software development outsourcing practices, creating confidence and trust among the outsourcing companies and to manage the expectations of what can and what cannot be done in a distributed setting [7,12,31,38,41,42,46]. However, despite the importance of offshore software development outsourcing, little empirical research has been carried out on offshore software development outsourcing practices in general and identification of barriers that have a significant impact on client organisations in particular. To do this we intend to address the following research questions:

RQ1. What barriers within a software outsourcing vendor organisations have a negative impact on software outsourcing clients?

RQ2. Do the identified barriers vary from continent to continent?

RQ3. How are these barriers related to the size of organisations?

RQ4. How are these barriers related to the study strategies used?

RQ5. Do the identified barriers vary from decade to decade?

By a negative impact we mean extent to which a certain barrier is perceived by practitioners as having an influence on the clients to avoid an outsourcing vendor.

Due to the space restriction in the APSEC 2009, previously we have published only two analyses from our SLR data [21]. This paper is a revised and substantially extended version in which we present findings from our SLR data about the barriers interrupting clients in the selection of offshore software outsourcing vendors. In this paper each barrier analysed and discussed with a detailed description of the research methodology used. In addition, statistical analysis has been performed in comparing barriers identified in two decades and by small, medium and large-sized organisations. Our long term research goal is to provide software development outsourcing practitioners with a body of knowledge that can help them to design and implement successful outsourcing initiatives.

This paper is organised as follows. Section 2 describes the background. Section 3 describes the research methodology. In Section 4 findings from the systematic literature review are presented and analysed with some discussion. In Section 5 overall summary and discussion is provided. Section 6 describes the limitations whereas Section 7 provides the conclusion and future work.

2. Background and motivation

In order to successfully design GSD initiatives, as researchers, we need to be constantly aware of what really undermines GSD processes. This will enable us to position our research within an appropriate context. It is important to discover which barrier will undermine GSD process, as research shows that half of the companies that have tried outsourcing have failed to realise the anticipated results [5]. The knowledge of these barriers may help us to develop new or improved GSD approaches, whose adoption will better match organisations' objectives.

GSD activities have been going on for more than a decade. However, software development outsourcing companies are still facing many problems. A number of researchers have tried to address some of the issues of software development outsourcing, e.g. [31,36–38,41]. To highlight few of these: a study was con-

ducted in the UK to manage the offshore software outsourcing relationships [36]. The focus of this study is around Indian software vendor organizations and their client organizations in US and European countries. A similar study was conducted by Nguyen et al. [31] to examine the offshore outsourcing relationships between the software vendors in Vietnam and their corresponding European and North American clients. Sabherwal [41] has worked on the role of trust in software outsourcing relationships. Rajkumar and Dawley [40] have worked on the offshore software outsourcing risks, benefits and conditions that are applicable in the Indian software industry and corresponding clients in US. Sakthivel [43] has also identified various risks related with offshore outsourced software development projects. Narayanaswarmy and Henry [29] have worked on the management of offshore outsourced software development projects. They have proposed a research model in which culture is considered as a prime factor affecting the choice of control mechanisms in offshore outsourced software development projects [29]. Aubert et al. [2] have developed a framework for the completeness of outsourcing contracts and associate costs in order to minimize risks. They have conducted an empirical study in order to measure different levels of outsourcing contract.

Other researchers have conducted systematic literature review on GSD/global software engineering. A systematic review was recently conducted at Sweden aiming to gauge the current state-of-the-art in the field of global software engineering [45]. The review results conclude that 'the majority of the studies represent problem-oriented reports focusing on different aspects of GSE management rather than in-depth analysis of solutions for example in terms of useful practices or techniques' [45]. Costa et al. [8] have identified models and tools for supporting the GSD through a systematic literature review and found that since 2000 the number of studies on GSD has significantly increased. However, they found that only few tools have been developed in this area. Hossain et al. [14] have conducted a systematic literature review that reports the use of Scrum practices in GSD projects. In another study different challenges in GSD and their proposed solutions have been discussed [16]. In another recent study challenges relating to GSD as well as their mitigation strategies were identified [15]. From the systematic literature review a total of 48 challenges and 42 mitigation strategies were identified. However, Jabangwe et al. [15] have concluded that more empirical research still needed in the domain of GSD in order to identify the challenges and mitigation strategies.

The work in this paper complements work previously done in these studies. However, despite the increasing importance and need for empirically tested body of knowledge on different aspects of GSD, little empirical research has been carried out in order to determine which barriers have a significant influence on software outsourcing clients in the selection process of offshore software development outsourcing vendors. The knowledge about these barriers will contribute in improving the readiness of offshore software development vendors as vendor organisations will try to address the barriers that have a negative impact on client organisations. In addition, understanding the GSD barriers will provide advice to GSD practitioners on what barriers to address when developing GSD strategies. Research in this area is expected to provide useful information for outsourcing vendor organisations.

In this paper we present an exploratory study in which a SLR is conducted in order to identify which barriers have a negative impact on the software development outsourcing clients in the selection of offshore software development outsourcing vendors. A good understanding of the issues involved in the selection of outsourcing vendors is expected to help vendor organisations to address these issues in order to compete internationally for attracting outsourced software development projects.

3. Research methodology

A systematic literature review (SLR) process [22] as the main approach for data collection because SLR is a defined and methodical way of identifying, assessing and analysing published primary studies in order to investigate a specific research question. Systematic reviews differ from ordinary literature surveys in being formally planned and methodically executed. In finding, evaluating and summarising all available evidence on a specific research question, a systematic review may provide a greater level of validity in its findings than might be possible in any one of the studies surveyed in the systematic review.

A systematic review protocol was written to describe the plan for the review, and this protocol is described in detail in a technical report [20]. The major steps in our methodology are:

Constructing search terms:

- Determine the search strategy then perform the search for relevant studies.
- Perform the study selection process.
- Apply study quality assessment.
- Extract data and analyse the extracted data.
- Details on the course of these steps are described in the following subsections.

3.1. Constructing search term

The following details of the population, intervention and outcomes have formed the basis for the construction of suitable search terms.

Population: Software outsourcing vendors' organisations and software outsourcing clients.

Intervention: Factors, characteristics, barriers.

Outcomes of relevance: Negative impact on clients in the selection process of vendors, capabilities of outsourcing vendors.

Experimental design: Empirical studies, theoretical studies, case studies, experts' opinions.

An example of the Research Question containing the above details is:

RQ1:

[What barriers]	INTERVENTION
[Software outsourcing clients]	POPULATION
[Negative impact]	OUTCOMES OF RELEVANCE

The experimental design is not included in the research questions as we are open to the types of study and due to the fact that there do not appear to be standard study approaches in the area of software development outsourcing.

3.2. Search strategy, and search

The search strategy for the SLR is a plan to:

a. Construct search terms by identifying population, intervention and outcome.
b. Find the alternative spellings and synonyms.
c. Verify the key words in any relevant paper.
d. Use Boolean Operators.

3.2.1. Results for (a)
Software outsourcing, vendors, barriers, vendor selection process, negative impact on client, vendor's selection process.

3.2.2. Results for (b)
Software outsourcing: ("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out")

Barriers: (barriers OR barrier OR obstacles OR hurdles OR risks OR "risk analysis" OR "critical factors")

Selection process: ("selection process" OR "selection criteria" OR "recruitment procedure" OR choosing OR methodology OR "analyzing vendor's capability" OR assessment OR "evaluation process" OR agreement OR contracting OR alliance OR co-ordination OR "outsourcing relationship")

Vendor(s): (vendors OR vendor OR service-provider OR dealer OR trader OR marketer OR seller OR developer)

Clients: (clients OR client OR outsourcer OR buyer OR customer OR purchaser OR user OR consumer OR shopper)

Undermine: (undermine OR damage OR challenge OR risk)

Negative impact: ("negative impact" OR "relationship failure" OR "poor results" OR dissatisfaction OR disappointment OR displeasure OR disagreement OR "bad effect" OR "lack of trust" OR unconfident OR rejection OR "uncertain decision" OR conflict OR uncertainties)

3.2.3. Results for (c)
IS/IT outsourcing, vendor selection criteria, motivators, risk analysis, outsourcing alliance, vendor screening.

3.2.4. Results for (d)
("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out") AND

((barriers OR barrier OR obstacles OR hurdles OR risks OR "risk analysis" OR "critical factors") OR

("selection process" OR "selection criteria" OR "recruitment procedure" OR choosing OR methodology OR "analyzing vendor's capability" OR assessment OR "evaluation process" OR agreement OR contracting OR alliance OR co-ordination OR "outsourcing relationship") OR

(vendor OR vendors OR service-provider OR dealer OR trader OR marketer OR seller OR developer) OR

(Clients OR client OR outsourcer OR buyer OR customer OR purchaser OR user OR consumer OR shopper) OR

(Undermine OR damage OR challenge OR challenges OR risk) OR

("negative impact" OR "relationship failure" OR "poor results" OR dissatisfaction OR disappointment OR displeasure OR disagreement OR "bad effect" OR "lack of trust" OR unconfident OR rejection OR "uncertain decision" OR conflict OR uncertainties))

An initial scoping study was conducted to determine the resources to be searched, and the search terms to use for each resource. In this scoping study a trial search was conducted using the following search string on CiteSeer digital library:

("software outsourcing" OR "IT outsourcing" OR "IS/IT") AND ("vendor" OR "selection criteria" OR "readiness" OR "client" OR "factors" OR "barriers" OR "models").

The information retrieved through this search string was used as a guide for the development and validation of the major search terms. The scoping study identified an initial list of resources, and an initial uniform search term. These were incrementally modified during the scoping study. Different resources required different syntax for the search terms. In the scoping study, some papers that were already known to be relevant were used to check the validity of the search terms. The resources searched in the scoping study included databases, specific journals, and conference proceedings. The final list of sources searched, their search terms, and the number of publications found for each resource are listed in Table 1. The search term mentioned in Section 3.2(d) was used for most

Table 1
Data sources.

Resource	Total results found	Primary selection	Final selection
IEEExplore	468	155	26
ACM	195	58	30
Science Direct	567	58	21
Google scholar	54	32	13
CiteSeer	16	16	08
Total	1300	319	98

of the databases during the literature search. However, Google scholar and CiteSeer have the limitation on the size of search string, due to which this search string was broken into smaller sub-strings as mentioned below.

Search string 1

("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out") AND

(barriers OR barrier OR obstacles OR hurdles OR risks OR "risk analysis" OR "critical factors")

Search string 2

("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out") AND

((undermine OR damage OR challenge OR risk) OR ("negative impact" OR "relationship failure" OR "poor results" OR dissatisfaction OR disappointment OR displeasure OR disagreement OR "bad effect" OR "lack of trust" OR unconfident OR rejection OR "uncertain decision" OR conflict OR uncertainties))

Search string 3

("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out") AND

("selection process" OR "selection criteria" OR "recruitment procedure" OR choosing OR methodology OR "analyzing vendor's capability", assessment, "evaluation process" OR agreement OR contracting OR alliance OR co-ordination OR "outsourcing relationship")

Search string 4

("software outsourcing" OR "information systems outsourcing" OR "information technology outsourcing" OR "IS outsourcing" OR "IT outsourcing" OR "CBIS outsourcing" OR "computer-based information systems outsourcing" OR "software facility management" OR "software contracting-out") AND

(clients OR client OR outsourcer OR buyer OR customer OR purchaser OR user OR consumer OR shopper)

3.3. Publication selection

3.3.1. Inclusion criteria

The following criteria were used to determine which piece of literature (papers, technical reports, etc.) found by the search term will be used for the data extraction.

- Studies that describe vendor's capabilities for software outsourcing.
- Studies that describe the barriers that have a negative impact on the software development outsourcing clients in the selection of offshore software development outsourcing vendors.

- Studies that describe the relationship between software outsourcer and vendor.
- Studies that describe de-motivation in software outsourcing.

3.3.2. Exclusion criteria

The following criteria were used to determine which piece of literature found by the search term will be excluded.

- Studies that are not relevant to the research questions.
- Studies that do not describe software outsourcing vendor or client.
- Studies that do not describe barriers in software outsourcing vendor selection process.

3.3.3. Selecting primary sources

The planned selection process had two parts: an initial selection from the search results of papers that could plausibly satisfy the selection criteria, based on a reading of the title and abstract of the papers; followed by a final selection from the initially selected list of papers that satisfy the selection criteria, based on a reading of the entire papers. The selection process was performed by a primary reviewer. However, in order to reduce the primary reviewer's bias the inter-rater reliability test was performed in which a secondary reviewer confirmed the primary reviewer results by randomly selecting the set of primary sources (i.e. five articles). We have identified 98 papers as shown in Table 1 and Appendix A.

3.4. Publication quality assessment

The measurement of quality was performed after final selection of publications. The quality of publications was assessed in parallel at the time of data extraction. The quality checklist contained the following questions:

- Is it clear how the vendor screening was performed?
- Is it clear how the barriers in the selection of software outsourcing vendor were identified?

Each of the above factors were marked as 'YES' or 'NO' or 'NA'. The results of the quality assessment study were used to limit the selection of publications. After applying the quality assessment criterion, all of the 98 papers were included in the final list.

We also believe that the selected publications are reliable as they have gone through external reviews that ascertain that these publications have sufficient quality to be included in this study.

3.5. Data extraction

The review was undertaken by a single researcher, who was alone responsible for the data extraction. A secondary reviewer was approached for guidance in case of an issue regarding the data extraction.

The inter-rater reliability test was performed after the data extraction process by the primary reviewer. The secondary reviewer selected five publications randomly from the list of publication already chosen by the primary reviewer. The secondary reviewer independently extracted the data from the randomly selected publication. The results were compared with the results produced by the primary reviewer and no differences were found.

From each paper we extracted a list of quotes, where each quote described a list of barriers that have a negative impact on software outsourcing clients in the selection process of offshore software development outsourcing vendors.

The following data was extracted from each publication: Date of review, Title, Authors, Reference, Database, Critical Barriers, Study Strategy (interview, case study, report, survey, etc.), Target

Table 2
List of barriers.

Barriers	Freq. (*n* = 98)	%
Communication gap	43	44
Country instability	50	51
Delays in delivery	22	22
Hidden costs	37	38
Incompatibility with client	10	10
Lack of project management	48	49
Lack of protection for intellectual property rights	46	47
Lack of technical capability	46	47
Language and cultural barriers	55	56
Lack of control over project	33	34
Poor quality of service and system/process	42	43
Opportunistic behaviour	27	28
Poor contract management	42	43
Poor infrastructure	32	33
Poor relationship management	43	44
Strategic inflexibility	10	10

Population, Sample Population, Publication Quality Description, Organisation Type (software house, university, research institute, etc.), Company size (small, medium, large), Country/Location of the Analysis and Year.

3.6. Data synthesis

Both primary reviewer and secondary reviewer performed the data synthesis. At the end of the Data Extraction phase described in Section 3.5, a list of barriers was identified from the sample of 98 papers. The primary researcher reviewed these in order to derive a list of categories to classify these barriers. Initially a list of 20 categories was identified. After a careful review of this list some of the categories were merged together giving a final list of 16 barriers shown in Table 2.

4. Result

4.1. Barriers identified through systematic literature review

In order to answer RQ1, Table 2 shows the list of barriers identified through the SLR. 'Language and cultural barriers' (56%) is the most common barrier identified in our study. Over the last decade, many firms in the USA and UK have outsourced software development projects to other countries such as India, China, Russia and Malaysia where English is not the first language [24]. In addition these countries have different culture as compared to the UK and USA. Various studies have described the impact of language and cultural differences on outsourcing business:

- In a study conducted in the UK and India, Sahay et al. [42] discussed different problems related to transfer of UK culture to India. They also described the role of power and control during the outsourcing business.
- In another study [35] some political and cultural issues in the globalisation of software development have been examined.

Our results indicate that 'country instability' (51%) has a negative impact on software development outsourcing clients. By 'country instability' we mean political instability, corruption, peace problems, terrorism threats and uncertainty relating to trade and investment. Khan et al. [19] have also identified this barrier as a critical barrier in their study in India: "instability of the political situation could act as a discouragement for the foreign investors to offshore outsourcing in India. Time to market is a very important factor in certain firms. Therefore, if the development process gets delayed due to impeding factors like strikes or power cuts, it becomes difficult to continue the process."

Nearly half of the articles in our study described 'lack of project management' as a barrier that can have a negative impact on outsourcing clients. In the outsourcing process an effective project management plays a vital role as it has been a difficult task to manage the geographical distributed teams: Zwikael and Sadeh [50] have found that improving the project planning is an effective tool in dealing with high-risk projects; Sun-Jen and Wen-Ming [47] have reported the impact of project planning on project duration; and Linda et al. [26] have described the 'lack of project planning' as a risk to software projects.

Our results also indicate that 'lack of technical capability' (47%) can undermine the selection of competent vendor organisations. Research suggests that half of the companies that have tried outsourcing have failed to realise the anticipated results [5]. One of the reasons for software development outsourcing failures is the difficulties in creating confidence and trust among the outsourcing companies [1,12]. We argue that addressing 'lack of technical capability' barrier can play a vital role in establishing a good relationship between client and vendor organisations as this will help vendor organisations to provide adequate technical services to client organisations. Various studies have also described the importance of this barrier:

- A high-quality skilled workforce is the backbone of the IT industry and vendors should employ high skilled workers with professional degrees in Computer Science, Engineering, Management and similar fields [30].
- Often a client organisation is eager to know the technical capability of vendor organisation [31].

Forty-seven percent of the articles in our study describe 'lack of protection for intellectual property rights' as a barrier to outsourcing due to the fact that there is no such thing as an "international intellectual property right" that automatically protects anybody's work throughout the world. Every country has its own national laws in order to protect individuals' work against unauthorised use. However, it is always hard to implement these laws in order to address issues relating to intellectual property rights [19]. In addition, our results indicate that issue of intellectual property rights is critical and has great impact on outsourcing clients in the selection of outsourcing vendors.

Forty-four percent of the articles in our study describe 'communication gap' as a barrier in outsourcing business. 'Poor relationship management' is also one the common barriers in our study, i.e. 44%. This suggests that poor relationship management has a negative impact on the outsourcing clients in the selection process of outsourcing vendors. Understanding different factors in managing software development outsourcing relationships can help to ensure the long lasting relationships between clients and vendors [11,41]. Different factors have been identified to effectively manage relationships between clients and vendors such as credibility, capabilities and personal visits [1].

Forty-three percent of articles in our study have cited a 'poor quality of service and system/process' as a barrier. We argue that in order to compete in an international outsourcing business vendor companies need to improve the quality of their processes and services. Indian software companies have been reported to provide high quality software [4] and this is the reason that in the software export market, India is a dominant software outsourcing provider [48].

We have also identified some other barriers that have a negative impact on client organisations as shown in Table 2.

4.2. Comparison of the barriers across various continents

Our results show the number of articles reporting studies related to different continents. Due to space limitation, in this paper we have only compared the barriers identified in three continents, i.e. Asia, North America and Europe. Our aim is to find whether these barriers differ from continent to continent. We suggest that understanding the similarities and differences in these barriers can contribute to the body of knowledge of software development outsourcing. This is because articles from different continents consider that barriers having some impact on client organisations should be taken very seriously by the vendor organisations in that continent.

As the data was of ordinal nature the linear by linear association Chi-Square test was used in order to find significant differences between barriers identified in three continents. The linear by linear association test is preferred when testing the significant difference between ordinal variables because it is more powerful than Pearson Chi-Square test [27].

Comparison of the barriers identified in three continents indicates that there are more similarities than differences between the barriers. We have found only three significant differences between the three continents as shown in Table 3. Our findings show that 'country instability' (65%, 43% and 71%), 'lack of protection for intellectual property rights' (52%, 46% and 47%), and 'poor contract management' (39%, 49% and 53%) are the most common barriers in all three continents. 'Lack of project management', 'lack of technical capability', 'language and cultural barriers', 'poor quality of service and system/process', and 'poor relationship management' are common barriers in Asia and Europe. Table 3 shows that clients in North America and Europe want 'control over project and they want to avoid outsourcing vendors who have 'opportunistic behaviour' in the outsourcing business. Our results indicate that outsourcing clients in North America (43%) and Europe (59%) have problems with 'hidden cost' during outsourcing business. 'Communication gap' is common in Europe (59%). Due to different cultures and languages in outsourcing business it is quite possible that a message is misunderstood by one or more of the outsourcing parties. In addition due to the geographical distributed teams in outsourcing business, face-to-face communication is not possible where one can clarify any misunderstanding. In the outsourcing processes the common methods for communications are email, phone and fax. However, in this modern age video conferencing is also emerging as a common communication tool.

These findings indicate that outsourcing clients are aware of the barriers that can undermine the whole outsourcing process. The purpose of this study is to explore different barriers that have a negative impact on outsourcing clients in the selection of outsourcing vendors. However, it is important to determine the reasons of why these barriers are commonly cited by the client organisations in Asia, Europe and North America. We encourage independent studies on this topic.

4.3. Barriers in small, medium and large-sized organisations

Our sample size is 98 papers, however, only 44 papers have mentioned the organisation size as shown in Table 4. Using the organisation size definition provided by the Australian Bureau of Statistics [49], we divided papers of these organisations into three categories: SMALL (0 to $\geqslant$19 employees), MEDIUM (20 to $\geqslant$199 employees), and LARGE (200 + employees).

Our results indicate that out of 16 barriers, 15 barriers have been reported in the small-sized organisations. The remaining one barrier has zero frequency for small organisations. Amongst these 15 barriers, 6 barriers have been cited in $\geqslant$50% of the articles. These 6 barriers are 'language and cultural barriers' – 64%, 'poor contract management' – 57% 'communication gap' – 50%, 'lack of project management' – 50%, 'lack of protection for intellectual property rights' – 50%, 'poor quality of service and system/process' – 50%. It is worth noting that the barrier, 'language and cultural barriers' has the highest percentages (64%) for smaller organisations.

For medium-sized vendor organisations we found 15 barriers in the literature. Ten barriers have been identified in $\geqslant$50% of the articles. The barriers 'country instability', 'lack of protection for intellectual property rights', and 'language and cultural barriers' have the highest percentage (89%) of occurrence in the medium-sized organisations. 'Lack of project management' and 'lack of technical capability' both are the 2nd most important barriers for medium-sized vendor organisations having 67% of occurrences in the literature. Other barriers such as 'communication gap', 'hidden costs', 'lack of control over project', 'poor infrastructure' and 'poor relationship management' are having 56% of occurrences in the literature.

For larger vendor organisations we found 16 barriers in the literature. Four barriers have been cited in $\geqslant$50% of the articles. The barrier 'lack of technical capability' has the highest percentage (62%) of occurrence for large sized software development outsourcing vendors. Other barriers such as 'language and cultural barriers', 'poor quality of service and system/process' and 'poor

Table 3
Summary of barriers across three continents as identified in the SLR.

Barriers	Occurrence in SLR (n = 98)						Chi-Square test (Linear-by-Linear association) α = .05		
	Asia (N = 23)		North America (N = 35)		Europe (N = 17)		X^2	df	p
	Freq.	%	Freq.	%	Freq.	%			
Communication gap	08	35	12	34	10	59	.600	1	.439
Country instability	**15**	**65**	**15**	**43**	**12**	**71**	**4.126**	**1**	**.042**
Delays in delivery	06	26	03	09	05	29	.121	1	.728
Hidden costs	08	35	15	43	07	41	.274	1	.601
Incompatibility with client	**0**	**0**	**05**	**14**	**01**	**06**	**4.241**	**1**	**.039**
Lack of project management	15	65	12	34	11	65	2.396	1	.122
Lack of protection for intellectual property rights	12	52	16	46	08	47	.147	1	.702
Lack of technical capability	10	44	13	37	10	59	.002	1	.965
Language and cultural barriers	13	57	13	37	12	71	.734	1	.392
Lack of control over project	05	22	13	37	06	35	1.054	1	.305
Poor quality of service and system/process	11	48	11	31	10	59	.280	1	.597
Opportunistic behaviour	04	17	13	37	06	35	.177	1	.674
Poor contract management	09	39	17	49	09	53	.034	1	.854
Poor infrastructure	09	39	10	29	06	35	.636	1	.425
Poor relationship management	**09**	**39**	**11**	**31**	**08**	**47**	**3.906**	**1**	**.048**
Strategic inflexibility	01	04	04	11	05	29	.803	1	.370

Table 4
Distribution of barriers based on company size.

Barriers	Company size						Chi-Square test (Linear-by-Linear association) α = .05		
	Small (n = 14)		Medium (n = 9)		Large (n = 21)		X^2	df	p
	Freq.	%	Freq.	%	Freq.	%			
Communication gap	7	50	5	56	8	38	.554	1	.457
Country instability	6	43	8	89	9	43	.050	1	.823
Delays in delivery	5	36	2	22	5	24	.530	1	.467
Hidden costs	4	29	5	56	6	29	.019	1	.890
Incompatibility with client	0	0	1	11	3	14	1.950	1	.163
Lack of project management	7	50	6	67	10	48	.050	1	.823
Lack of protection for intellectual property rights	7	50	8	89	7	33	1.413	1	.235
Lack of technical capability	5	36	6	67	13	62	2.034	1	.154
Language and cultural barriers	9	64	8	89	11	52	.751	1	.386
Lack of control over project	4	29	5	56	5	24	.200	1	.655
Poor quality of service and system/process	7	50	4	44	11	52	.029	1	.865
Opportunistic behaviour	3	21	3	33	8	38	1.022	1	.312
Poor contract management	8	57	2	22	8	38	.978	1	.323
Poor infrastructure	3	21	5	56	7	33	.334	1	.563
Poor relationship management	4	29	5	56	11	52	1.696	1	.193
Strategic inflexibility	1	7	0	0	1	5	.067	1	.795

Table 5
Distribution of barriers based on study strategies.

Barriers	Study strategies							Chi-Square test (Linear-by-Linear association) α = .05		
	Case studies (n = 26)	Experience reports (n = 15)	Interviews (n = 11)	Literature reviews (n = 21)	Surveys (n = 15)	SLR (n = 0)	Other (n = 10)	X^2	df	p
	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.	Freq.			
Communication gap	13	7	6	8	3	0	6	.347	1	.556
Country instability	16	6	3	15	5	0	5	.308	1	.579
Delays in delivery	**8**	**3**	**5**	**5**	**0**	**0**	**1**	**3.802**	**1**	**.051**
Hidden costs	8	5	3	10	5	0	6	2.311	1	.128
Incompatibility with client	2	1	2	1	2	0	2	.940	1	.332
Lack of project management	14	7	4	13	4	0	6	.034	1	.853
Lack of protection for intellectual property rights	6	9	5	15	6	0	5	2.436	1	.119
Lack of technical capability	10	4	5	13	8	0	6	3.530	1	.060
Language and cultural barriers	**18**	**9**	**8**	**12**	**3**	**0**	**5**	**4.756**	**1**	**.029**
Lack of control over project	**6**	**4**	**1**	**10**	**7**	**0**	**5**	**4.965**	**1**	**.026**
Poor quality of service and system/process	11	6	3	13	4	0	5	.084	1	.772
Opportunistic behaviour	11	1	1	4	6	0	4	.080	1	.778
Poor contract management	**9**	**4**	**2**	**12**	**10**	**0**	**5**	**4.436**	**1**	**.035**
Poor infrastructure	9	3	4	8	5	0	3	.017	1	.896
Poor relationship management	15	6	7	6	6	0	3	3.102	1	.078
Strategic inflexibility	2	0	0	4	3	0	1	1.739	1	.187

relationship management' have 52% of occurrences in the literature for large-sized vendor organisations.

We did not find any significant differences amongst the barriers based on company size. However, we found varying occurrences of various barriers across small, and medium and large-sized organisations as shown in Table 4. The barrier 'lack of protection for intellectual property rights' has raised from 50% to 89% across small and medium-sized organisations. However, it drops down to 33% for large-sized organisation. This may be due to the fact that small organisations have difficulties in establishing patent and best practices for the privacy of clients. This barrier is less frequent for large organisations. This may be due to the fact that large organisations have already established best practices for the protection for intellectual property rights.

4.4. Barriers based on study strategies

We have grouped the papers found through SLR into seven study strategies, which are commonly used in the empirical software engineering, as shown in Table 5. These study strategies are

case studies, experience reports, interviews, literature reviews, questionnaire surveys, systematic literature review (SLR) and other. By 'other' we mean analysis of archival performance data, focus group sessions, workshops, Delphi study, a quasi field experiment, analytical hierarchy process), and action research, an economic procedure Discrete Choice Analysis (DCA) for quantifying the relative weights of the attributes. These seven study strategies were initially identified by the primary reviewer during the data extraction process. However, secondary reviewer has validated these study strategies using the inter-rater reliability test discussed in Section 3.3.3.

We have identified various barriers based on the distribution of papers across these seven study strategies. Our results indicate that all of the 16 barriers have been reported in the literature relating to case studies, literature reviews and other. Amongst these 16 barriers, five barriers in the case studies, seven barriers in the literature reviews and 10 barriers in other have been cited in $\geq$50% of the articles. 'Language and cultural barriers' is the frequently cited (69%) barrier in the case studies, 'country instability' and 'lack of protection for intellectual property rights' are the frequently cited

Table 6
Analysis of CBs based on periods/decades.

Barriers	Occurrence in SLR (N = 98)				Chi-Square test (Linear-by-Linear association) α = .05		
	Period				X^2	df	P
	1990–1999 (N = 18)		2000–mid 2008 (N = 80)				
	Freq.	%	Freq.	%			
Communication gap	1	6	42	53	13.016	1	.000
Country instability	6	33	44	55	2.732	1	.098
Delays in delivery	0	0	22	28	6.318	1	.012
Hidden costs	5	28	32	40	.924	1	.336
Incompatibility with client	2	11	8	10	.020	1	.889
Lack of project management	4	22	44	55	6.253	1	.012
Lack of protection for intellectual property rights	8	44	38	48	.055	1	.815
Lack of technical capability	10	56	36	45	.651	1	.420
Language and cultural barriers	2	11	53	66	17.956	1	.000
Lack of control over project	6	33	27	34	.001	1	.973
Poor quality of service and system/process	6	33	36	45	.808	1	.369
Opportunistic behaviour	6	33	21	26	.366	1	.545
Poor contract management	11	61	31	39	2.970	1	.085
Poor infrastructure	5	28	27	34	.236	1	.627
Poor relationship management	5	28	38	48	2.297	1	.130
Strategic inflexibility	4	22	6	8	3.440	1	.064

(71%) barriers in literature reviews, and 'communication gap', 'hidden costs', 'lack of project management' and 'lack of technical capability' are the frequently cited barriers (60%) in the other.

In the articles relating to interviews, surveys and experience reports study strategies, 15 barriers have been reported. Amongst these 15 barriers, three barriers in the interviews, two barriers in the surveys and two barriers in experience reports have been cited in ≥50% of the articles.

The SLR study strategies is presented with zero sample size (n = 0) in Table 5. This means that in our study we did not find any article depicting systematic literature review process. These findings confirm the novelty of our research strategy in this specific domain.

We have used Linear-by-Linear Chi-Square test for the identification of significance difference amongst the various barriers across various study strategies. We have identified only four significant differences for the barriers 'delays in delivery', 'language and cultural barriers', 'lack of control over project', and 'poor contract management'.

4.5. Barriers based on decades

Table 6 presents an analysis of barriers based on decades. The papers found through the SLR are grouped into two decades, i.e. 1990–1999 and 2000–mid 2008. It should be noted that in the SLR no date boundaries were imposed on the search. However, only papers across the period from 1990 till the mid of 2008 (Mid 2008 is the completion of search phase in our SLR process) were found.

Our results indicate 15 barriers have been reported in the literature during the first decade. Amongst these 15 barriers, 2 barriers have been cited in ≥50% of the articles. These frequently cited barriers are 'poor contract management – 61%', and 'lack of technical capability' – 56%. Between 1990–1999 period, the poor contract management has the highest frequency (61%) which means that poor contract management was the biggest obstacle for vendors in their selection for software outsourcing project. However, this trend has been dramatically changed with the passage of time because we find a down turn in the frequency of poor contract management, which has been reduced to 39% in the 2nd decade.

In the 2nd decade, 16 barriers have been reported in the literature. Amongst these 16 barriers, only four barriers have been cited

in ≥50% of the articles. These barriers are 'language and cultural barriers' – 66%, 'country instability' – 55%, 'lack of project management' – 55%, and 'communication gap' – 53%.

We have used Linear-by-Linear Chi-Square test for the identification of significance difference for four barriers 'communication gap, 'delays in delivery', 'lack of project management' and 'language and cultural barriers' for which the p value is less than .05.

5. Summary and discussions

This study has identified the barriers which can influence clients in the selection of offshore software outsourcing vendors. Our research goal is to provide software outsourcing practitioners with a body of knowledge that can help them to design and implement successful outsourcing initiatives. Barriers represent some of the key areas where management should focus their attention in order to better design software outsourcing initiatives. In order to decide the criticality of a barrier, we have used the following criterion:

- If a barrier is cited in the literature with a frequency percentage of ≥50% then we treat that barrier as a critical barrier (CB) in this explorative study.

We have used the similar criterion in our previous research [32–34]. A similar criterion has also been used by other researchers [39]. Rainer and Hall [39] have identified important factors in SPI with the criterion that if 50% or more participants perceive that a factor has a major role in SPI efforts then that factor should be treated as having a major impact on SPI. However, software outsourcing practitioners can define their own criteria in order to decide the criticality of listed outsourcing barriers.

In order to address RQ1, using the above criterion we have identified the two barriers in the literature that are generally considered critical in the selection of software development outsourcing vendors. These CBs are: language and cultural barriers, and country instability. However, other barriers which have the frequency percentage ≥30, are also important and need to be avoided by the vendors in order to win outsourcing projects. These barriers are: lack of project management, lack of protection for intellectual property rights, lack of technical capability, communication gap, poor relationship management, poor quality of service and system/process,

poor contract management, hidden costs, lack of control over project and poor infrastructure.

In order to address RQ2, we have identified:

- No common CBs in all continents.
- Country instability, language and cultural barriers and lack of project management are critical in Asia and Europe.
- Lack of protection for intellectual property rights is critical in Asia only.
- Communication gap, lack of technical capability, poor quality of service and system/process and poor contract management are critical in Europe only.

Comparison of the barriers identified in three continents indicates that there are more similarities than differences between the barriers. Table 3 shows that 15 barriers are cited in Asia, 16 barriers in North America and 16 barriers in Europe. We have found only three significant differences between the three continents (i.e. country instability, incompatibility with client and poor relationship management).

For RQ3, using the criterion for CBs, we have identified:

- We identified 6, 10 and 4 CBs for small, medium and large-sized organisations respectively. By comparing these CBs we identified only one common barrier in three types of organisations which is 'language and cultural barriers'. This means that this barrier should be taken seriously by vendor organisations.
- Communication gap, lack of project management and lack of protection for intellectual property rights are critical in small and medium-sized organisations.
- Poor quality of service and system/process is critical for small and large-sized organisations.
- Lack of technical capability and poor relationship management are critical for medium and large-sized organisations.
- Poor contract management is critical in small-sized organisations only.
- Country instability, hidden costs, lack of control over project and poor infrastructure are critical in medium-sized organisations only.

The summary of our findings for RQ3 is given in Table 7.

RQ4 relates to different study strategies used in the literature. For RQ4, using the criterion for CBs, we have identified:

- 'Language and cultural barriers' is critical in case studies, experience report, interviews, literature reviews and other.
- 'Communication gap' is critical in case studies, interviews, literature reviews, and other.
- 'Country instability' is critical in case studies, literature reviews, and other.
- 'Poor relationship management' is critical in case studies and interviews.
- 'Lack of project management' is critical in case studies, literature reviews, and other.
- 'Lack of protection for intellectual property rights' is critical in experience report, literature reviews and other.
- 'Lack of technical capability' is critical in literature reviews, surveys and other.
- 'Poor contract management' is critical in literature reviews, surveys and other.
- 'Poor quality of service and system/process' is critical in literature reviews and other.
- 'Hidden costs' is critical in other study strategies only.

The summary of barriers identified through SLR for various study strategies is given in Table 8.

Table 7
Distribution of CBs across various companies.

Company Size	No. of barriers	No. of critical barriers (cited in ≥50% of the articles)
Small (n = 14)	15	We have identified the following six barriers: • Language and cultural barriers • Poor contract management • Communication gap • Lack of project management • Lack of protection for intellectual property rights • Poor quality of service and system/process
Medium (n = 9)	15	We have identified the following 10 barriers: • Country instability • Lack of protection for intellectual property rights • Language and cultural barriers • Lack of project management • Lack of technical capability • Communication gap • Hidden costs • Lack of control over project • Poor infrastructure • Poor relationship management
Large (n = 21)	16	We have identified the following four barriers: • Lack of technical capability • Language and cultural barriers • Poor quality of service and system/process • Poor relationship management

The last research question is about barriers in two decades. For RQ5, using the criterion for CBs, we have identified:

- No CBs which are common in both decades.
- Poor contract management and lack of technical capability are critical in 1990–1999.
- Language and cultural barriers, country instability, lack of project management and communication gap are critical in 2000–mid 2008.

The summary of barriers identified through SLR for various decades is given in Table 9.

Comparing critical barriers (CBs) across two decades, mentioned in Tables 6 and 9, we find more differences than similarities. This indicates a divergence in the trend towards critical barriers across the two periods. However, our results indicate a substantial difference in the sample size of the two decades. The sample size for decade2 is 80 which is almost four times greater than the sample size of articles identified for decade1. One possible reason may be due to the boom in software development outsourcing activities in the decade2 which caught the attention of academics and researchers. These results complement the findings of other researchers regarding the growth in software outsourcing industry with respect to time. "Despite the current economic downturn, the offshore outsourcing market is expanding to offer both a bigger choice of locations and a wide range of services" [23]. The results also reveal the variation in the occurrences of barriers across the two specified periods. Although the Linear-by-Linear Chi-Square test reveals a significant difference for four barriers 'communication gap, 'delays in delivery', 'lack of project management' and 'language and cultural barriers' for which the p value is less than .05. However, we observe the rise and fall in occurrences of various barriers across the two periods. The results presented in Table 6 confirm an increase in occurrences of 11 barriers from 1990–1999 to 2000–mid 2008 as mentioned below:

- 'Hidden costs' rises from 28% to 40%.
- 'Country instability' rises from 33% to 55%.

Table 8
Distribution of CBs across various study strategies.

Study strategies	No. of barriers	No. of critical barriers (cited in ≥50% of the articles)
Case studies (*n* = 26)	16	We have identified the following five barriers: • Language and cultural barriers • Country instability • Poor relationship management • Lack of Project Management • Communication gap
Experience reports (*n* = 15)	15	We have identified the following two barriers: • Lack of protection for intellectual property rights • Language and cultural barriers
Interviews (*n* = 11)	15	We have identified the following three barriers: • Language and cultural barriers • Poor relationship management • Communication gap
Literature reviews (*n* = 21)	16	We have identified the following seven barriers: • Country instability • Lack of protection for intellectual property rights • Lack of Project Management • Lack of technical capability • Poor quality of service and system/process • Language and cultural barriers • Poor contract management
Surveys (*n* = 15)	15	We have identified the following two barriers: • Poor contract management • Lack of technical capability
SLR (*n* = 0)	0	0
Other (*n* = 10)	16	We have identified the following 10 barriers: • Communication gap • Hidden costs • Lack of project management • Lack of technical capability • Country instability • Lack of protection for intellectual property rights • Language and cultural barriers • Lack of control over project • Poor quality of service and system/process • Poor contract management

- 'Communication gap' rises from 6% to 53%.
- 'Delays in delivery' rises from 0% to 28%.
- 'Lack of Project Management' rises from 22% to 55%.
- 'Language and cultural barriers' rises from 11% to 66%.
- 'Poor relationship management' rises from 28% to 48%.
- 'Lack of protection for intellectual property rights' rises from 44% to 48%.
- 'Lack of control over project' rises from 33% to 34%.
- 'Poor quality of service and system/process' from 33% to 45%.
- 'Poor infrastructure' from 28% to 34%.

There is a downturn percentage for the rest of barriers across the two decades mentioned in Table 6. 'Poor contract management' and 'lack of technical capability' dropped from 61% to 39% and 56% to 45% respectively. This indicates that these barriers are no longer considered as critical for clients in vendor's selection during the second decade. To find the reason why 'poor contract management' and 'lack of technical capability' are not critical during the second decade, one possible reason may be that these two barriers have

Table 9
Distribution of CBs across decades/periods.

Period/decade	No. of barriers	No. of critical barriers (cited in ≥50% of the articles)
Decade1 (1990–1999) *n* = 18)	15	We have identified the following two barriers: • Poor contract management • Lack of technical capability
Decade2 (2000–mid 2008) (*n* = 80)	16	We have identified the following four barriers: • Language and cultural barriers • Country instability • Lack of Project Management • Communication gap

been replaced by 'poor relationship management' and 'poor quality of service and system/process' because we find an increase in their occurrences as mentioned in Table 6. Moreover quality products can be produced due to strong technical and skilled human resources. In general our results indicate that 'poor contract management' and 'lack of technical capability' are no longer the critical barriers for clients in the selection of vendors for outsourcing their software development projects. However, the rise in other barriers mentioned in Table 6 shows that the trend towards software outsourcing has been changed with the passage of time. Vendors need to address these newly emerged challenges seriously to gain clients' favour in software development outsourcing projects.

6. Limitations

How valid are our findings of barriers in the selection process of offshore software development outsourcing vendors? One possible threat to internal validity is that for any specific article, their reported barriers may not have in fact described underlying reason. We have not been able to independently control this threat. The authors of these studies were not supposed to report the original reasons why these barriers were considered during the selection of vendors. It is also possible that in some studies there may have been a tendency for particular kinds of barriers to be reported. Many of the contributing studies were self-reported experience reports, case studies and empirical studies which may be subject to publication bias.

During the data extraction phase we found several papers lacking sufficient details regarding company size, i.e. in our sample of 98 papers only 44 paper have provided details of the company size. Due to this limitation we were unable to give full picture of our entire 98 sample in the analysis relating to company size. With the increasing number of papers in software outsourcing, our SLR process may have missed out some relevant papers. However, like other researchers of SLR this is not a systematic omission [14].

How safe is it to generalise these findings? Our sample contains many articles from many countries (Table 3). Our findings are not based on studies that used a random sample of software-developing outsourcing organisations in the world. However, in the investigation of our research questions, our study is the most comprehensive to date. The issue of generalising these findings can also be considered by comparing our findings with results from other related studies, as discussed in result sections. We found many similarities in our findings and findings by other people, and this provides some support for generalisation.

During the selection of primary studies and data extraction we have performed the inter-rater reliability tests in order to reduce the researcher's bias. However, it was not possible to check each and every paper by the secondary reviewer.

Due to limited resources we are unable to claim that we have used all the available digital libraries such as Scopus. However,
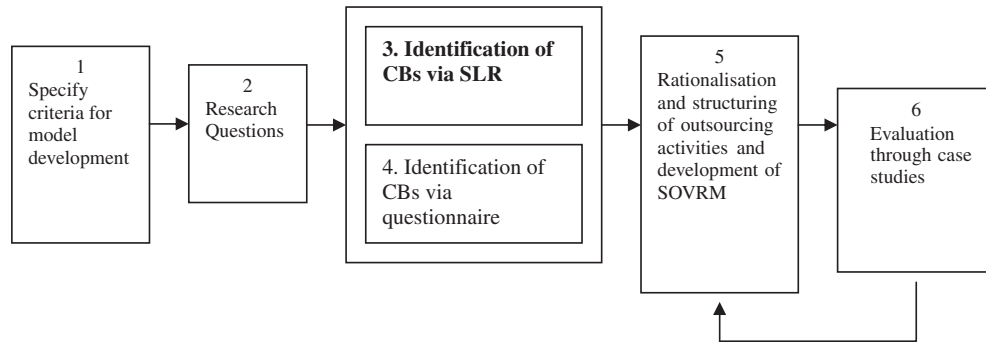
Fig. 1. Activities involved in building the SOVRM.

the digital libraries used are enough to generalise the findings in our study.

7. Conclusion and future work

Our findings indicate that 'language and cultural barriers', 'country instability', 'lack of project management', 'lack of protection for intellectual property rights' and 'lack of technical capability' have a negative impact on software development outsourcing clients in the selection of software development outsourcing vendors. We suggest that outsourcing vendors should focus on these barriers in order to have a positive impact on outsourcing clients and to win outsourcing contracts. We have also compared these identified barriers across the reported datasets for the continents of Asia, Europe and North America and found that there are more similarities than differences between the barriers. However, we did not identify any common barrier in three continents. We have also identified only one common barrier in three types of organisations (i.e. small, medium and large) which is 'language and cultural barriers'.

Our objective is to provide software development outsourcing vendors with a body of knowledge that can help them to design and implement successful outsourcing initiatives. We suggest that the outsourcing vendors should focus in general on the frequently cited barriers identified in Table 2 (RQ1). Vendors who are involved in outsourcing from different continents, should focus on the frequently cited barriers identified in Table 3 (RQ2). If vendors are doing outsourcing with different types of organisations (Small, Medium and Large) then they should focus on the frequently cited barriers identified in Table 4 (RQ3). In case vendors want to know the outsourcing barriers in different decades, they can use Table 6 (RQ5).

We encourage independent studies on this topic. This will increase confidence in our findings and also track changes in attitudes to offshore outsourcing over time. From the findings of this study, we have identified the following goals that we plan to follow in future:

- Validate these barriers using empirical studies with software outsourcing practitioners.
- Conduct empirical studies to determine how to address these barriers which have been frequently cited in our study.
- It is also important to determine the reasons of why some barriers are not critical for client organisations in Asia, Europe and North America and/or small, medium and large-sized organisations.

Our ultimate aim is to develop a Software Outsourcing Vendors Readiness Model (SOVRM) as shown in Fig. 1. This paper contributes to only one component of the SOVRM, i.e. the identification of the barriers. The eventual outcome of the research is the development of SOVRM to assist offshore outsourcing vendors in assessing their readiness for software development outsourcing activities. SOVRM will also assist in improving software development outsourcing processes. The SOVRM proposed will bring together and advance the work that has been undertaken on frameworks and models for outsourcing. Our contribution to improving software development outsourcing processes will provide other researchers with a firm basis on which to develop different outsourcing processes that are based on an understanding of how and where they fit into the software development outsourcing activities. New outsourcing practices could then be developed targeting software development outsourcing projects.

Many research outputs end up with a model or framework which never makes it into industrial practice. We expect our work will reduce this trend in outsourcing by identifying a well understood and rationale outsourcing vendors' readiness model. Our aim is to help companies to avoid randomly implementing promising new models and frameworks just to see them be discarded.

Acknowledgements

Appendix A. A list of papers

1. An analysis of capabilities of Pakistan as an offshore IT services outsourcing destination
2. The who, what, why, where, and when of IT outsourcing
3. Critical Barriers in Outsourcing: Case of Software Industry
4. Evaluating offshore IT outsourcing in India: supplier and customer Scenarios
5. An Analysis Framework of Factors Influencing China Software and Information Service Offshore Outsourcing
6. Selecting software subcontractors
7. China as a Software Outsourcing Outlet: Status, Enabling Factors, International Impact, and Growth Determinants
8. A Framework to Enable Offshore Outsourcing
9. IT Offshoring Risks and Governance Capabilities

10. Synching or sinking: global software outsourcing relationships
11. Characteristics of IT outsourcing contracts
12. Analyzing IT outsourcing relationships as alliances among multiple clients and vendors
13. Information Systems Outsourcing Vendor Selection Based on Analytic Hierarchy Process
14. Managing the Risk of IT outsourcing
15. Agile Methods handling Offshore Software Development Issues
16. Optimizing Supplier Management in Global Software Engineering
17. Global software development at Siemens: experience from nine projects
18. Strategic moves: outsourcing is a #1 concern
19. An empirical assessment of transaction risks of IT outsourcing arrangements: an event study
20. Averting security missteps in outsourcing
21. IT Application Assessment Model for Global Software Development
22. Use of Agile Methods and Practices in the Philippines
23. The Influence of Financialization in Information Technology (IT) Management: Evidences from the Outsourcing Decision-Making Process in Brazilian Companies
24. Offshore Outsourcing: Counteracting Forces and Their Dynamic Effects
25. A Practical Management and Engineering Approach to Offshore Collaboration
26. Engineering the Irish Software Tiger
27. Vendor Screening In IT Contracting With a Pilot Project
28. A Study OF the Outsourcing Decision: Preliminary Results
29. Critical Factors in Software Outsourcing – A Pilot Study
30. Game Theory Perspective on Client-Vendor Relationships in Offshore Software Outsourcing
31. Critical Factors in Establishing and Maintaining Trust in Software Outsourcing Relationships
32. Research on IT Outsourcing based on IT Systems Management
33. A framework for the analysis of co-ordination in global software development
34. The role of trust in outsourced IS development projects
35. A state-transition approach to application service provider client-vendor relationship development
36. IT outsourcing evolution—: past, present, and future
37. A two-level investigation of information systems outsourcing
38. A conceptual process framework for IT-supported international outsourcing of software production
39. Cultural influences and globally distributed information systems development: experiences from Chinese IT professionals
40. Managing risk in offshore systems development
41. The process of building GSO relationships: the experience of a multinational vendor with Indian contractors
42. The new world of information technology outsourcing
43. Outsourcing relationship literature: an examination and implications for future research
44. Where does Russia fit into the global software industry?
45. Information systems outsourcing
46. A relationship perspective on IT outsourcing
47. The impact of offshore outsourcing on IT workers in developed countries
48. A research agenda for distributed software development
49. The role of software processes and communication in offshore software development
50. A concerted effort towards flourishing global software development
51. A resource-based analysis of IT sourcing
52. Effects of culture on control mechanisms in offshore outsourced IT projects
53. A risk profile of offshore-outsourced development projects
54. A design of an empirical study of the applicability of the technology acceptance model to outsourcing decisions
55. Managing cross-cultural issues in global software outsourcing
56. Fuzzy approach to outsourcing of information technology services
57. A comparison of institutional systems affecting software advancement in China and India: The role of outsourcing from Japan and the United States
58. A longitudinal examination of partnership governance in offshoring: A moving target
59. Is more IT offshoring better? An exploratory study of western companies offshoring to South East Asia
60. What is the right outsourcing strategy for your process?
61. Software maintenance outsourcing: Issues and strategies
62. From application service provision to service-oriented computing: A study of the IT outsourcing evolution
63. Innovation risks of strategic outsourcing
64. Risk mitigation in IT outsourcing strategy revisited: longitudinal case research at LISA
65. Is outsourcing of intangibles a real source of competitive advantage?
66. Impact of Organizational and Contract Flexibility on Outsourcing Contracts
67. Supplier selection and order lot sizing modeling: A review
68. Determinants of success for application service provider: An empirical test in small businesses
69. Procedural co-ordination and offshored software tasks: Lessons from two case studies
70. Institutional factors affecting offs hore business process and information technology outsourcing
71. An investigation of factors that influence the duration of IT outsourcing relationships
72. Information technology outsourcing in Europe and the USA: Assessment issues
73. Offshoring: Dimensions and diffusion of a new business concept
74. IT outsourcing: Evidence from France and Germany
75. Exploring information technology outsourcing relationships: theory and practice
76. Vendor Selection Criteria and Post-Implementation Evaluation Practices for IS/IT Outsourcing: A Case Study of a Developing Country
77. Global software outsourcing: The solution to the IT skills gap
78. Comparative Analysis Between the Public and Private Sectors on the IS/IT Outsourcing Practices in a Developing Country: A Field Study
79. When Subordinates Become IT Contractors: Persistent Managerial Expectations in IT Outsourcing (2001)
80. IS/IT Outsourcing Practices in the Public Sector: A Case Study of a Developing Country (2000)
81. Outsourcing of Software Development (2005)

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